# Western balsam bark beetle use of spruce-fir blowdown in Wyoming

Kurt K. Allen, Daniel F. Long, Joel D. McMillin & Jose F. Negron, R2 FHP, Rapid City, SD and RMRS, Ft. Collins, CO

**Contact: Kurt Allen, 1730 Samco Road, Rapid City, SD 57702 – kallen@fs.fed.us - (605) 394-6051**

## Introduction

Western balsam bark beetle (*Dryocoetes confusus* Swaine) attacks subalpine fir (*Abies lasiocarpa*) throughout western North America (Furniss and Carolin 1980). However, little is known about factors contributing to outbreaks of this species (McMillin et al. 2001). Tree blowdown is known to trigger outbreaks of certain bark beetles, such as spruce beetle (Schmid and Frye 1977), but has not been examined for western balsam bark beetle. This is despite observational studies having found outbreaks of this beetle adjacent to areas of tree blowdown (Figure 1).

Study Objectives

1. Does western balsam bark beetle successfully attack and produce brood in downed fir?
2. Do pheromone baits increase the number of brood in felled trees?
3. Does brood production vary by the location on the bole?
4. What is the life history of western balsam bark beetle in blowdown?

Answers to these questions should be applicable to many areas of the central and northern Rockies where there are extensive stands of predominantly subalpine fir, blowdown events have occurred and western bark beetle is present.

**Figure 1**. Subalpine fir mortality caused by western balsam bark beetle adjacent to area of blowdown on the Bighorn National Forest.

## Methods and Materials

The studies were conducted on the Bighorn and Shoshone National Forests, Wyoming. The areas are characterized by mixed stands of SAF, Engelmann spruce and lodgepole pine.

1. Five trees were felled at each of four locations on both the Bighorn and Shoshone National Forests in early July 2001.
2. At half of the locations the felled trees were baited with *exo*-brevicomin and the other locations were not baited.
3. In September 2001 trees were sampled for the number of brood by life stage in 36 in$^2$ taken from the top and bottom aspect at DBH, mid-bole, and the upper crown.
4. The number of initial attacks were also recorded in 72 in$^2$ taken from the top and bottom aspect at DBH, mid-bole and upper crown .
5. Brood sampling were repeated in the fall 2002 to look at the life cycle of this beetle.

**Figure 2.** 6 inch by 6 inch bark sample taken from felled tree showing WBBB galleries

## Results

•Western balsam bark beetle have attacked and brood are developing in the felled trees (Figures 3-5).

•Most of the brood in felled trees in 2001 were in the larval or egg stage, while in 2002, there were almost no eggs and almost half were new adults (Figure 3). This, in part, could give an indication of a 2 year life cycle in these areas.

•There were no new attacks identified in 2002. All brood apparently came from attacks initiated in 2001.

•The mid-bole portion of felled trees had more brood than DBH or the crown on the bole of the tree in both years (Figure 4).

• The use of pheromones (tree baits) did not increase the number of brood in felled trees. In fact, there were almost twice the number of brood in unbaited trees as opposed to baited trees in both years (Figure 5).

•Generally speaking, more brood were found on the bottom aspect of the felled trees than the top for both forests combined (Figure 4).

**Figure 3. Life stage of western balsam bark beetle brood in feeled trees in 2001 and 2002**

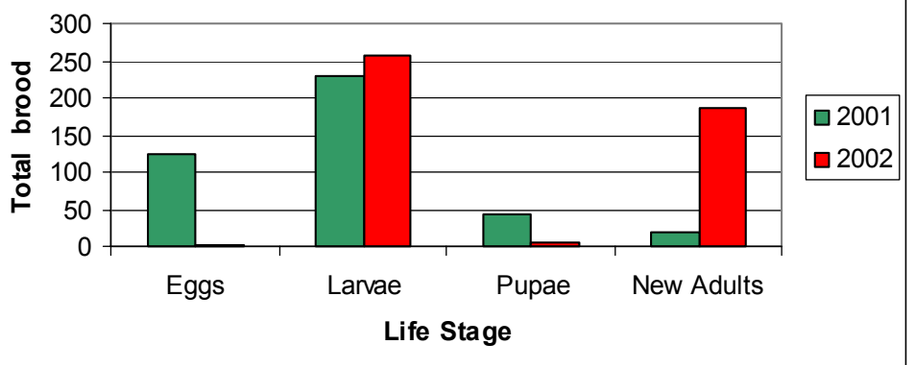



**Figure 4. Bole location of western balsam bark beetle brood in 2001 and 2002**

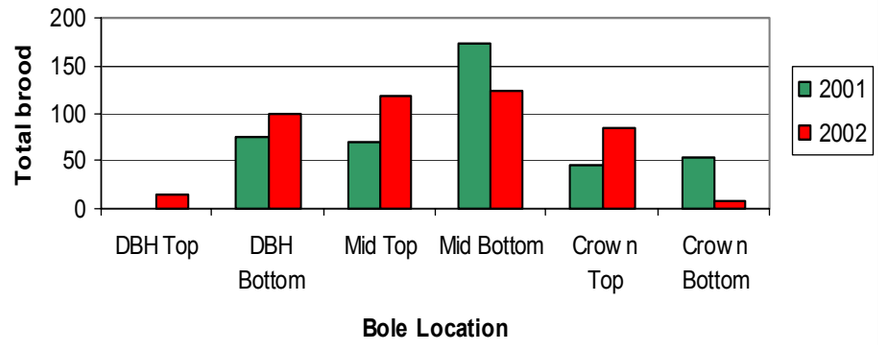
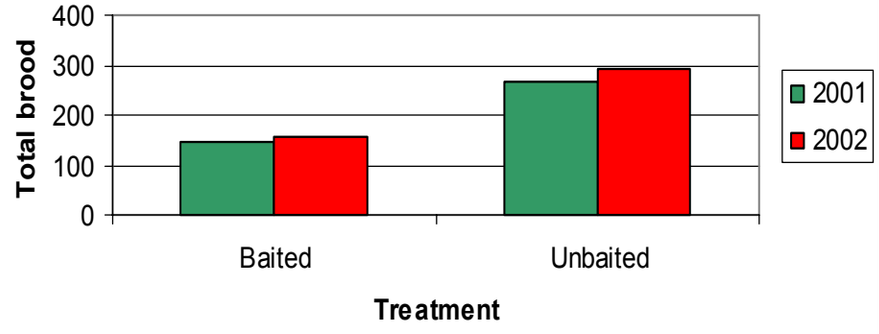



**Figure 5. Western balsam bark beetle brood production in baited vs. unbaited trees in 2001 and 2002**




## Conclusions

•Based on the preliminary data, we conclude that western balsam bark beetle takes advantage of storm events that create downed host material.

• Prompt management of downed material may be beneficial to reducing the likelihood of subsequent western balsam bark beetle outbreaks. Removal of the downed material should be done within 2 years of the storm event.

•Entire trees, including the tops, would need to be treated or removed to reduce western balsam bark beetle populations.

• Furthermore, intentionally felled trees could possibly be used in a trap tree approach to reduce local populations of western balsam bark beetle similar to strategies used for spruce beetle.

## Literature Cited

Furniss, R.L. and V.M. Carolin. 1980. Western Forest Insects. USDA Forest Service Misc. Publication 1339.

McMillin, J.D., K.K. Allen, J.L. Harris and D.F. Long. 2001. Stand level impact of subalpine fir decline in spruce-fir forest type of the north-central Rocky Mountains. USDA Forest Service Technical Report R2–65.

Schmid, J.M. and R.H. Frye. 1977. Spruce Beetle in the Rockies. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-49. 38 p.

**FHM Posters home page | FHM 2003 posters**